Modeling as Negotiating: The Political Dynamics of Computer Models in the Policy Process. By William H. Dutton and Kenneth L. Kraemer. (Norwood, New Jersey: Ablex Publishing, 1985. Pp. xiii + 261. $39.50.)

The Dynamics of Computing. By John L. King and Kenneth L. Kraemer. (New York, N.Y.: Columbia University Press, 1985. Pp. xii + 283. $40.00.)

Against the background of Orwellian nightmares portraying computers as efficient instruments of government oppression and control, these two books examine the routine realities of computer processing and computer-based modeling in local government decision making. One of the studies, *Modeling as Negotiating*, argues that computer models can and actually do promote negotiation and compromise among pluralistic interests in a democratic policy process. This general finding emerged unexpectedly from the authors' case studies and surveys, and it led them to formulate a "consensual" view of modeling as an improvement on the more traditional rationalist, technocratic, and partisan perspectives that dominate the literature. The other study, *The Dynamics of Computing*, surveys local government computing policies and practices during the period 1974-1979 in 40 American cities and 16 cities in nine Organization for Economic Cooperation and Development (OECD) member nations. It finds that computer utilization creates different types of problems and benefits depending on a government's prior experience with computers and its current goals and expectations. Management policies involving technological development, managerial structures, and "socio-technical interface" (e.g., user training) are not panaceas for problems that keep changing with each advancing stage of computer application in the policy process.

Of the two books, *Modeling as Negotiating* is by far the superior work in terms of study design, conceptual clarity, substantive findings, and provocative ideas. The authors base most of their analysis on four case studies (Irvine, CA; San Diego, CA; Tulsa, OK; Anaheim, CA) of local governments that used computerized fiscal impact models in making land-use decisions during the late 1970s. They also conducted a mail survey of principal analysts and model users in the 21 local governments that employed one of the four fiscal impact models examined. (Fiscal impact models calculate the likely public costs and revenues generated by alternative development patterns associated with proposed general plans, major rezonings, housing developments, proposed freeways, new tax rates, etc.). Departing from most earlier studies, the authors focus on the politics of implementing these models in the policy process, rather than on technical aspects of model development. Their study was guided by two broad questions: Who controls how these models are used?, and, Whose interests are served by them?

Addressing the question of control, the authors conclude that "[n]o one individual or group systematically and uniformly dominates all activities and decision processes" (p. 157). They argue that modeling is "labyrinthian" in the sense that "there are multiple actors whose participation varies from stage to stage, and within stages" (p. 159). The cases clearly demonstrate that modeling "is not simply an activity of the model builders and consultants" (p. 160), and that elected officials, planners, bureaucrats, private developers, and community activists all play important roles in shaping the assumptions, data, and alternatives fed into the models. In adapting models to local circumstances, these actors find their attention increasingly fixed on the computer map rather than the actual territory of their disputes. Model-building unfolds as an iterative, n-person bargaining game and becomes democratized as many hands, in effect, tap at the keyboard to reprogram assumptions, set parameters, and execute runs. According to the authors, this kind of pluralistic "modeling as negotiating" tends to promote consensus as an unintended byproduct of the modeling process itself, and not primarily as a result of the model's outputs. This "consensual perspective" on modeling is offered both as an empirical generalization of their findings and as a normative guide to planners and consultants. They write: "When the modeling process is carried on as an isolated technical exercise or as an obvious partisan maneuver, the models tend to lack relevance or credibility, respectively, in the decision-making process" (p. 211).

Regarding the question of whose interests are served by modeling, the authors conclude that fiscal impact models "appear to systematically advantage those community groups and interests supportive of exclusionary, fiscal zoning policies. Lower-income renters and their advocates are disadvantaged" (p. 197). They worry that routine incorporation of such modeling can lead to the "automation of bias" in local government decision making (p. 215).

I found *Modeling as Negotiating* to be a valuable and insightful study of computer modeling in the policy process. The case studies almost stand alone as interesting and well-told stories of the politics of development. (Sample quote from an Anaheim developer commenting on a computer model's incomprehensibility: "[I]t was so complicated that it was unintelligible to non-experts. It was like handing a copy of *Gray's Anatomy* to a housewife to deal with her kid's cold.") Not only is the book an excellent contribution to the scholarly literature of political science and public administration, it also offers an open harvest of practical advice to those planners and consultants who have computers and will travel in the domain of politics.

The authors of *Modeling as Negotiating* make an interesting comment that is relevant to an evaluation of the second book under review: "Ironically, computers permit incomprehensible models to be built, in that computer programs can handle more variables, calculations, and data elements than any single person could fully comprehend" (p. 173). Computers also permit incomprehensible books to be written, particularly when the computer's numerical output is virtually dumped in undigested heaps on page after page of abstract prose. Despite the authors' worthy scholarly purpose, *The Dynamics of Computing* suffers from near-incomprehensibility in several chapters precisely because of human failure to select, organize, and interpret the machine's abundant output in theoretically meaningful terms. To illustrate, in one chapter three short paragraphs are devoted to an interpretation of two tables containing 346 Pearson correlation coefficients (pp. 119-125). Similar occurrences of statistical mountains accompanied by verbal molehills are found throughout the book. Relationships involving many interesting variables (e.g., degree of data linkage, centralization, and size of EDP staff) are explored using correlation and regression analysis, but the authors rarely descend to the level of discrete linkages to make theoretical sense of their findings. They prefer to generalize in terms of such "variables" as "management policies," "computing environment," "benefits," and "problems," which are dimensionless vacuities lacking any metric or meaning beyond their service as category labels.

The sampling design of the study appears flawed. For unstated "statistical reasons" (p. 16), only 40 of the original 400 American cities surveyed were included in this analysis, 20 at the high end and 20 at the low end of six policy continua measuring such things as a city's degree of automation and degree of decentralization of computing resources. This selectivity undermines any generalization of findings to the total population of medium-sized and large cities. The study's analytical methodology is not articulated or defended in any one place but becomes manifest only as the book unfolds. Factor analysis is employed in analyzing certain categories of variables, but not others. Partial correlations are shown controlling for city size but not for other variables. Regression analyses were performed, but it is not clear what independent variables were specified in the regression equations. By conventional standards of scientific reporting, the table reporting the regression results (Table 7.1) is almost incoherent.

The authors aspire to answer the question of "what computing, broadly conceived, looks like *in vivo*" (p. 15). In fact, they examine not a single "living" local government system but only scattered traces in the verbal reports of survey respondents. The only "dynamics" in this study are applications of what the authors call "stage theory" to the cross-sectional survey data. Such theories certainly seem necessary in our efforts to track and comprehend the computer revolution, but the particular theory expounded here is rough and sterile. (Here is a sample "implication" derived-from the "theory": "[C]omputing development is highly dynamic, but ultimately is controllable through concerted and informed policy action" [pp. 205-206].) On the whole, this is not a book to be recommended.

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